AMENDMENT TO THE CLAIMS

1. (Currently Amended) A method of determining an estimate for a noise-reduced value representing a portion of a noise-reduced speech signal, the method comprising:

generating an alternative sensor signal using an alternative sensor other than an air conduction microphone;

converting the alternative sensor signal into at least one alternative sensor vector in the cepstral domain; ~~and~~

adding a weighted sum of a plurality of correction vectors to the alternative sensor vector to form the estimate for the noise-reduced value in the cepstral domain, wherein each correction vector corresponds to a mixture component and each weight applied to a correction vector is based on the probability of the correction vector's mixture component given the alternative sensor vector;

generating an air conduction microphone signal;

converting the air conduction microphone signal into an air conduction vector in the power spectrum domain;

estimating a noise value;

subtracting the noise value from the air conduction vector to form an air conduction estimate in the power spectrum domain;

converting the estimate of the noise-reduced value from the cepstral domain to the power spectrum domain; and

combining the air conduction estimate and the estimate for the noise-reduced value in the power spectrum domain to form the refined estimate for the noise-reduced value in the power spectrum domain.

2. (Original) The method of claim 1 wherein generating an alternative sensor signal comprises using a bone conduction microphone to generate the alternative sensor signal.

3. (Canceled)

4. (Canceled)

5. (Original) The method of claim 1 further comprising training a correction vector through steps comprising:

generating an alternative sensor training signal;

converting the alternative sensor training signal into an alternative sensor training vector;

generating a clean air conduction microphone training signal;

converting the clean air conduction microphone training signal into an air conduction training vector; and

using the difference between the alternative sensor training vector and the air conduction training vector to form the correction vector.

6. (Previously Presented) The method of claim 5 wherein training a correction vector further comprises training a separate correction vector for each of the plurality of mixture components.

7. (Canceled)

8. (Canceled)

9. (Currently Amended) The method of claim ~~8~~ 1 further comprising using the refined estimate for the noise-reduced value to form a filter.

10. (Canceled)

11. (Original) The method of claim 1 further comprising:

generating a second alternative sensor signal using a second alternative sensor other than an air conduction microphone;

converting the second alternative sensor signal into at least one second alternative sensor vector;

adding a correction vector to the second alternative sensor vector to form a second estimate for the noise-reduced value; and

combining the estimate for the noise-reduced value with the second estimate for the noise-reduced value to form a refined estimate for the noise-reduced value.

12. (Currently Amended) A method of determining an estimate of a clean speech value, the method comprising:

receiving an alternative sensor signal from a sensor other than an air conduction microphone;

receiving a noisy~~an air~~ conduction microphone signal from an air conduction microphone;

identifying which frequency of a group of candidate frequencies is a pitch frequency for a speech signal based on the alternative sensor signal;

using the pitch frequency to decompose the noisy air conduction microphone signal into a harmonic component and a residual component by modeling the harmonic component as a sum of sinusoids that are harmonically related to the pitch; and

using the harmonic component and the residual component to estimate the clean speech value by determining a weighted sum of the harmonic component and the residual component, the clean speech value representing a noise-reduced signal having reduced noise relative to the noisy air conduction microphone signal.

13. (Original) The method of claim 12 wherein receiving an alternative sensor signal comprises receiving an alternative sensor signal from a bone conduction microphone.

14. (Currently Amended) A computer-readable storage medium storing computer-executable instructions for performing steps comprising:

receiving an alternative sensor signal from an alternative sensor that is not an air conduction microphone;

receiving a noisy test signal from an air conductive microphone;

generating a noise model from the noisy test signal, the noise model comprising a mean and a covariance;

converting the noisy test signal into at least one noisy test vector;

subtracting the mean of the noise model from the noisy test vector to form a difference;

forming an alternative sensor vector from the alternative sensor signal;

adding a correction vector to the alternative sensor vector to form an alternative sensor estimate of a clean speech value; and

setting a weighted sum of the difference and the alternative sensor estimate as an estimate of the clean speech value, wherein the weighted sum is computed using the covariance of the noise model to compute weights for the weighted sum.

15. (Previously Presented) The computer-readable storage medium of claim 14 wherein receiving an alternative sensor signal comprises receiving a sensor signal from a bone conduction microphone.

16. (Canceled)

17. (Previously Presented) The computer-readable storage medium of claim 14 wherein adding a correction vector comprises adding a weighted sum of a plurality of correction vectors, each correction vector being associated with a separate mixture component.

18. (Previously Presented) The computer-readable storage medium of claim 17 wherein adding a weighted sum of a plurality of correction vectors comprises using a weight that is based on the probability of a mixture component given the alternative sensor vector.

19. (Canceled)

20. (Canceled)

21. (Canceled)

22. (Canceled)

23. (Previously Presented) The computer-readable storage medium of claim 14 wherein the estimate of the clean speech value is in the power spectrum domain.

24. (Previously Presented) The computer-readable storage medium of claim 23 further comprising using the estimate of the clean speech value to form a filter.

25. (Canceled)

26. (Canceled)

27. (Canceled)

28. (Canceled)

29. (Previously Presented) The computer-readable storage medium of claim 14 further comprising:

receiving a second alternative sensor signal from a second alternative sensor that is not an air conduction microphone; and

using the second alternative sensor signal with the alternative sensor signal to estimate the clean speech value.

30. (Canceled)